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REMARKS

Claims 1-21 are pending.

Claims 1-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention, on the ground that it is unclear what reaction occurs and which reactants participate in step (b) of claim 1. In response, Applicants amend claim 1 to recite that the second reaction conditions are sufficient to alkylate benzene with monoolefins. Support for the amendment is at page 13, lines 4-25; page 15, lines 12 to 28; page 16, line 24 to page 17, line 2. Therefore, the rejection of claim 1 under 35 U.S.C. 112, second paragraph, as being indefinite should be withdrawn. The rejection of claims 2-21 under 35 U.S.C. 112, second paragraph, as being indefinite should be withdrawn for the reasons given in support of claim 1 because they are dependent on claim 1.

Claims 1-14 and 18-21 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,133,492 ("Anantaneni"). Claim 1 is rejected on the ground that it would have been obvious to modify Anantaneni's process by placing the mordenite upstream relative to the silica-alumina catalyst and by eliminating the fluoride from the Anantaneni catalyst and thereby arrive at claim 1, since it is expected that using any sequence of mordenite and silica-alumina catalysts would also reach 70% of 2-phenyl isomers where a lower selectivity of 2-phenyl isomers is desired. This rejection should be withdrawn because Anantaneni does not teach or suggest a process for producing linear alkylbenzenes comprising contacting benzene and an olefinic feedstock comprising a linear monoolefin having from about 8 to about 28 carbon atoms and having a concentration of coboiling aromatics of less than 2 wt-%, with a first catalyst comprising mordenite operating at first reaction conditions sufficient to alkylate benzene with the monoolefin and form linear phenyl-alkanes, wherein the first catalyst has a fluoride content of less than 0.05 wt-% based on the weight of the mordenite in the first catalyst, and recovering from the first reaction zone a first reaction product comprising linear phenyl-alkanes; and contacting at least a portion of the first reaction product with a second catalyst comprising silica-alumina operating at second reaction conditions sufficient to alkylate benzene with monoolefin, and recovering from the process a second reaction product comprising linear phenyl-alkanes, wherein the linear phenyl-alkanes in the second reaction product comprise linear 2-phenyl-

alkanes and wherein the second reaction product has a concentration of linear 2-phenyl-alkanes of from about 25 to about 80 wt-% based on the linear phenyl-alkanes in the second reaction product. Applicants were the first to teach or suggest such a process comprising, among other things, contacting an olefinic feedstock having a concentration of coboiling aromatics of less than 2 wt-% with a first catalyst having a fluoride content of less than 0.05 wt-% based on the weight of the mordenite in the first catalyst. Applicants were also first to teach or suggest that a combination of a low-fluoride first catalyst and a low concentration of coboiling aromatics in the olefinic feedstock would produce a stability benefit. See page 2, line 18 to page 3, line 13; page 6, line 11 to page 7, line 7.

Anantaneni is directed to a fluorine-containing mordenite catalyst and use thereof in the manufacture of linear alkylbenzene (LAB) by alkylation of benzene with an olefin, and the olefins employed by Anantaneni are those available commercially or produced as dehydrogenated paraffin feed stocks. Abstract; Col. 4, lines 33-38; col. 6, lines 19-22. Anantaneni's dehydrogenated paraffin feed may be supplied from any provider and the source of dehydrogenated paraffin (olefin) is not critical to Anantaneni's process. Col. 7, lines 57-60. Also, the HF-treated mordenite of Anantaneni generally has about 0.1 percent by weight or more of fluorine based on the total weight of the mordenite. Col. 4, lines 16-18. All of Anantaneni's examples 1-8 use fluoride-treated or fluoride-modified catalysts, and only comparative example 1, which shows poor performance, uses untreated mordenite, with no fluoride added. Col. 8, lines 33-51; col. 10, lines 23-54. Anantaneni's clear focus is on fluorine-containing mordenite prepared by fluorine treating. Col. 1, line 30 to col. 2, line 53.

For all of these reasons, Anantaneni not only fails to motivate a person of ordinary skill in the art to use a low-fluoride mordenite-containing first catalyst but also fails to teach or suggest a process for producing linear alkylbenzenes as recited in Applicants' claim 1 that includes, among other things, contacting an olefinic feedstock having a concentration of coboiling aromatics of less than 2 wt-% with a first catalyst having a fluoride content of less than 0.05 wt-% based on the weight of the mordenite in the first catalyst. Therefore, the rejection of claim 1 under 35 U.S.C. §103(a) as being unpatentable over Anantaneni should be withdrawn. The rejection of claims 2-14 and 18-21 under 35 U.S.C. §103(a) as being unpatentable over Anantaneni should be withdrawn for the reasons given in support of claim 1 because they are dependent on claim 1.

Having shown that Anantaneni alone does not render claims 1-14 and 18-21 obvious to a person of ordinary skill in the art, it can be readily shown that Anantaneni in view of U.S. Patent No. 4,870,222 ("Bakas") also does not render claims 15-17, because Bakas alone or in combination with Anantaneni does not teach or suggest a process for producing linear alkylbenzenes as recited in Applicants' claim 1 that includes, among other things, contacting an olefinic feedstock having a concentration of coboiling aromatics of less than 2 wt-% with a first catalyst having a fluoride content of less than 0.05 wt-% based on the weight of the mordenite in the first catalyst. Bakas teaches a process having an alkylation reaction zone and a transalkylation reaction zone, Bakas fails to teach using mordenite as an alkylation catalyst, and Bakas's mordenite catalyst is used only for transalkylation. Abstract; Col. 1, lines 38-45; col. 7, lines 29-34; col. 11, line 39 to col. 12, line 13. Therefore, the rejection of claims 15-17 under 35 U.S.C. §103(a) as being unpatentable over Anantaneni in view of Bakas should be withdrawn.

Claims 1-21 of the subject application are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-25 of U.S. Patent No. 6,521,804 ("Marinangeli") on the ground that claims 1-21 of the subject application are not patentably distinct from claims 1-25 of Marinangeli, because it would have been obvious to modify the process in claims 1-25 of Marinangeli by selecting a mordenite catalyst containing an amount of fluoride of less than 0.05 wt-% and an olefinic feed containing less than 2 wt-% of coboiling aromatics and thereby arrive at the process in claims 1-21 of the subject application, since claims 1-25 of Marinangeli include steps substantially the same as claims 1-21 of the subject application.

Marinangeli has two independent claims, 1 and 25. Claim 1 of Marinangeli recites an process for producing phenyl-alkanes, the process comprising:

- a) contacting an aryl compound and a monoolefin having from about 8 to about 28 carbon atoms, 3 or 4 primary carbon atoms, and no quaternary carbon atoms, with a first catalyst comprising mordenite operating at first reaction conditions sufficient to alkylate the aryl compound with the monoolefin and thereby form a phenyl-alkane, and recovering a first reaction product comprising the phenyl-alkane;
- b) contacting the first reaction product with a second catalyst comprising silica-alumina operating at second reaction conditions, and recovering from the process a second

reaction product comprising a phenyl-alkane having one aryl portion and one aliphatic alkyl portion containing from about 8 to about 28 carbon atoms; wherein the phenyl-alkane in the second reaction product has 2, 3, or 4 primary carbon atoms and no quaternary carbon atoms except for any quaternary carbon atom bonded by a carbon-carbon bond with a carbon atom of the aryl portion; and wherein the process has an overall selectivity to nonquaternary 2-phenyl-alkanes of from 40 to 100 and an overall selectivity to end quaternary phenyl-alkanes of less than 10 based on the second reaction product.

Claim 25 of Marinangeli recites an process for producing phenyl-alkanes, the process comprising:

a) contacting an aryl compound and monoolefins with a first catalyst comprising mordenite operating at first reaction conditions sufficient to alkylate the aryl compound with the monoolefins, and recovering a first reaction product comprising arylalkanes; and

b) contacting the first reaction product with a second catalyst comprising fluorided silica-alumina operating at second reaction conditions and recovering from the process a second reaction product comprising arylalkanes having one aryl group and one aliphatic alkyl group, wherein the arylalkanes in the second reaction product have:

- (i) an average weight of the aliphatic alkyl groups of the arylalkanes of between the weight of a C₁₀ aliphatic alkyl group and a C₁₃ aliphatic alkyl group;
- (ii) a content of arylalkanes having the phenyl group attached to the 2- and/or 3-position of the aliphatic alkyl group of greater than 55 wt-% of the arylalkanes; and
- (iii) an average level of branching of the aliphatic alkyl groups of the arylalkanes of from 0.25 to 1.4 alkyl group branches per arylalkane molecule when the sum of the contents of 2-phenyl-alkanes and 3-phenyl-alkanes is more than 55 wt-% and less than or equal to 85 wt-% of the arylalkanes, or an average level of branching of the aliphatic alkyl groups of the arylalkanes of from 0.4 to 2.0 alkyl group branches per arylalkane molecule when the sum of the concentrations of 2-phenyl-alkanes and the

3-phenyl-alkanes is greater than 85 wt-% of the arylalkanes; and wherein the aliphatic alkyl groups of the arylalkanes comprise linear aliphatic alkyl groups, mono-branched aliphatic alkyl groups, or di-branched aliphatic alkyl groups, and wherein the alkyl group branches if any on the aliphatic alkyl chain of the aliphatic alkyl groups comprise methyl group branches, ethyl group branches, or propyl group branches, and wherein the alkyl group branches if any attach to any position on the aliphatic alkyl chain of the aliphatic alkyl groups provided that arylalkanes having at least one quaternary carbon atom on the aliphatic alkyl group comprise less than 20% of the arylalkanes;

c) recovering arylalkanes from second reaction product.

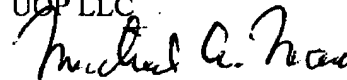
The rejection of claim 1 of the subject application under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-25 of Marinangeli should be withdrawn for the failure of claims 1-25 of Marinangeli to teach or suggest to a person of ordinary skill in the art a process for producing linear alkylbenzene comprising, among other things, contacting an olefinic feedstock having a concentration of coboiling aromatics of less than 2 wt-% with a first catalyst having a fluoride content of less than 0.05 wt-% based on the weight of the mordenite in the first catalyst. By contrast, claims 1-25 of Marinangeli are silent on the concentration of coboiling aromatics in an olefinic feedstock and the fluoride content of the first catalyst. Additionally, claims 1-25 of Marinangeli do not teach or suggest a range of concentration of linear 2-phenyl-alkanes of from about 25 to about 80 wt-% based on the linear phenyl-alkanes in the second reaction product. By contrast, claims 1-25 of Marinangeli teach or suggest an overall selectivity to nonquaternary 2-phenyl-alkanes of from 40 to 100, on the one hand, or concentrations based on the sum of 2-phenyl-alkanes and 3-phenyl-alkanes, on the other hand.

The rejection of claims 2-21 of the subject application under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-25 of Marinangeli patent should be withdrawn for the reasons given in support of claim 1 because they are dependent on claim 1.

The subject application is now believed to be in a condition for an allowance of claims 1-21 and such action is respectfully requested.

Respectfully submitted,

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